

We claim:

1. A biaxially textured article comprising a biaxially textured substrate having thereon at least one epitaxial nitride layer,
2. The biaxially textured article of Claim 1 such that the substrate has a {100}<100> orientation texture.
3. The biaxially textured article of Claim 1 wherein the substrate is a biaxially textured metal or alloy.
4. The biaxially textured article of Claim 1 wherein the substrate is biaxially textured Ni or a Ni alloy.
5. The biaxially textured article of Claim 1 wherein the nitride layer is selected from a group comprising of but not limited to TiN, CeN, ZrN, HfN, VN, NbN, NdN, LaN, YN, and AlN.
6. The biaxially textured article of Claim 1 further comprising at least one additional nitride layer.
7. The biaxially textured article of Claim 1 further comprising an oxide buffer layer consisting of but not limited to MgO, CeO<sub>2</sub>, YSZ, LaAlO<sub>3</sub>, SrTiO<sub>3</sub>, LaNiO<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, RE<sub>2</sub>O<sub>3</sub>.
8. The biaxially textured article of Claim 1 further comprising an electro-magnetic device layer such as a superconducting layer.
9. The biaxially textured article of Claim 7 further comprising an electro-magnetic device layer such as a superconducting layer.
10. The biaxially textured article of Claim 1 wherein the substrate is a single crystal metal substrate.
11. The biaxially textured article of Claim 10 further comprising an oxide buffer layer consisting of but not limited to MgO, CeO<sub>2</sub>, YSZ, LaAlO<sub>3</sub>, SrTiO<sub>3</sub>, LaNiO<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, RE<sub>2</sub>O<sub>3</sub>.

12. The biaxially textured article of Claim 10 further comprising an electro-magnetic device layer such as a superconducting layer.

13. The biaxially textured article of Claim 12 further comprising an electro-magnetic device layer such as a superconducting layer.

14. A biaxially textured article comprising a biaxially textured substrate having thereon at least one epitaxial layer of composition  $M1_xM2_yN$ , where M1 and M2 refer to metals selected from a list comprising of but not limited to Ti, Ce, Y, Zr, Hf, V, Nb, Nd, La, and Al, and x and y refer to the atomic compositions of the two metals respectively.

15. The biaxially textured article of Claim 14 such that the substrate has a  $\{100\}<100>$  orientation texture.

16. The biaxially textured article of Claim 14 wherein the substrate is a biaxially textured metal or alloy.

17. The biaxially textured article of Claim 14 wherein the substrate is biaxially textured Ni or a Ni alloy.

18. The biaxially textured article of Claim 14 further comprising an oxide buffer layer consisting of but not limited to MgO, CeO<sub>2</sub>, YSZ, LaAlO<sub>3</sub>, SrTiO<sub>3</sub>, LaNiO<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, RE<sub>2</sub>O<sub>3</sub>.

19. The biaxially textured article of Claim 14 further comprising an electro-magnetic device layer such as a superconducting layer.

20. The biaxially textured article of Claim 18 further comprising an electro-magnetic device layer such as a superconducting layer.

21. The biaxially textured article of Claim 15 wherein the substrate is a single crystal metal or ceramic substrate.

22. The biaxially textured article of Claim 21 further comprising an oxide buffer layer consisting of but not limited to MgO, CeO<sub>2</sub>, YSZ, LaAlO<sub>3</sub>, SrTiO<sub>3</sub>, LaNiO<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, RE<sub>2</sub>O<sub>3</sub>.

23. The biaxially textured article of Claim 21 further comprising an electro-magnetic device layer such as a superconducting layer.

24. The biaxially textured article of Claim 22 further comprising an electro-magnetic device layer such as a superconducting layer.

25. A method of preparing a biaxially textured substrate comprising the steps of:

- providing a biaxially textured substrate having a surface; and,
- depositing onto said surface, with or without the presence of nitrogen gas, an epitaxial layer of a metal nitride, containing one or more metals in each layer selected from a group consisting of but not limited to Ti, Ce, Zr, Hf, V, Nb, Nd, La, and Al.

26. A method in accordance with Claim 25 wherein said biaxially textured substrate has {100}<100> orientation texture.

27. A method in accordance with Claim 25 wherein the substrate is a biaxially textured metal or alloy.

28. A method in accordance with Claim 25 wherein the substrate is biaxially textured Ni or a Ni alloy.

29. A method in accordance with Claim 25 wherein the substrate is a biaxially textured metal or alloy.

30. A method in accordance with Claim 25 wherein the substrate is a single crystal metal substrate.

31. A method in accordance with Claim 25 wherein the deposition is performed using magnetron sputtering.

32. A method in accordance with Claim 25 wherein the deposition is performed using electron beam evaporation.

33. A method in accordance with Claim 25 wherein the deposition is performed using pulsed laser ablation.

34. A method in accordance with Claim 25 wherein the deposition is performed using sol-gel deposition.

35. A method in accordance with Claim 25, further comprising the steps of:

- depositing onto said surface of last layer at least one oxide layer from a group comprising of but not limited to MgO, CeO<sub>2</sub>, YSZ, LaAlO<sub>3</sub>, SrTiO<sub>3</sub>, BaPbO<sub>3</sub>, LaNiO<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, RE<sub>2</sub>O<sub>3</sub>.

36. A method in accordance with Claim 25, further comprising the steps of:

- depositing onto said surface of last layer at least one electromagnetic device layer such as a superconducting oxide layer.

37. A method in accordance with claim 35, further comprising the steps of:

- depositing onto said surface of last layer at least one electromagnetic device layer such as a superconducting oxide layer.